REMARKS/ARGUMENTS

Reconsideration and allowance in view of the foregoing amendment and the following remarks are respectfully requested.

Original claims 13 and 14 were objected to as improper hybrid method claims. Claims 13 and 14 have been revised so as to be simply dependent claims modifying the system of claim 1. Reconsideration and withdrawal of this rejection are solicited.

Claims 1-12 were rejected under 35 USC 102(b) as being anticipated by Nakona [sic; Nakano] or Shimada. Applicant respectfully traverses this rejection.

Nakano and Shimada relate to algorithms for detection of a collision between two or more objects in a given moment. The present invention has important features that distinguish it from Nakano and Shimada relating to both function and structure. In this regard, the present invention provides for the detection of potential collisions assuming that present motion patterns are maintained. Collision is avoided by influencing the possibility of motion of the objects within the physical given geometric relations and frames. In this regard, the method of the invention for avoiding collisions between objects influences the motion pattern of the objects as little as possible, rather monitoring the relative position and speed of the objects to determine whether the objects have come dangerously close considering a critical distance between the two.

More specifically, as is well understood from a careful review of Nakano, Nakano provides an apparatus for detecting that a collision of objects has (already) occurred. In complete contrast to the invention, there is no teaching or suggestion of monitoring a distance between objects so that a defined critical distance is maintained between the objects so that a collision can be avoided. Clearly, Nakano relates to an entirely different concept and, thus, an entirely different system than the claimed invention.

Shimada relates to an object collision detection apparatus in connection with the planning of production that examines the trajectories of adjacent objects to determine

whether a collision will occur or is likely to occur. As such, Shimada is adapted to the design of a system where objects will repeatedly follow a particular or prescribed path. In contrast, the invention relates to a system for preventing collisions between moving objects that may not follow a prescribed trajectory. Rather, the relative positions of the objects and the critical distance that must be maintained between them is monitored so that a speed or direction of the respective object can be adjusted or an object stopped to avoid a collision. Shimada clearly relates to a robot system design in the first instance and not a dynamic, active system, as claimed by Applicant. Thus, Shimada does not teach or suggest how a collision can be avoided in a system of the type claimed, and is not capable of performing the respective functions thereof.

Claims 7-8 were rejected under 35 USC 102(b) as being anticipated by Starl [sic; Stark]. Applicant respectfully traverses this rejection.

Stark relates to algorithms for detection of the minimal distance between two objects. The invention claimed is distinguished from Stark in both its function and structure. In this regard, the claimed invention comprises detection of potential collisions based on the current motion patterns being maintained and avoids collision by influencing the possibility of motion of objects within the physical given geometric relations and frames. Meanwhile, collision is avoided with minimum influence on the motion pattern of the objects.

In contrast to the invention, Stark teaches approximating the outer contour of the respective moving bodies, e.g. with spheres, and the use of position transducers, and then determines the distance between each sphere of one body and each sphere of the second body to determine the risk of collision. Clearly, then, Stark does not teach assigning a geometric shape to each (entire) moving object and monitoring a distance between respective geometric shapes to ensure a critical distance is maintained to avoid collision. Rather than assigning a geometric shape to each object, Stark assigns a plurality of subvolumes (such as spheres) and, in connection with Stark's method, the

distance between each sphere of one body and each sphere of the other body is calculated. As such, Stark does not teach the limitations of Applicant's method claim, but rather teaches a far more complex and cumbersome system. The assignment of a (single) geometric shape effectively and efficiently avoids collision according to the invention, without the requirement for position transducers and complex subvolume assignments as taught by Stark.

Claims 13 and 14 were rejected under 35 USC 103(a) as being unpatentable over Nakano or Shimada in view of Krueger. Applicant respectfully traverses this rejection. The claims are submitted to be distinct from Nakano and Shimada for the reasons advanced above. The Examiner's further reliance on Krueger does not overcome the deficiencies of the primary references noted above. It is therefore respectfully submitted that these claims are also allowable over the applied art.

All objections and rejections having been addressed, it is respectfully submitted that the present application is in condition for allowance and an early Notice to that effect is earnestly solicited.

Respectfully submitted,

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